Second SEDAR

(South East Data, Assessment and Review)

Consensus Assessment Report

on the assessments of the Status of the Stocks

of

Vermilion Snapper and Black Sea Bass from the south east of the U.S.

Second SEDAR Review Panel Workshop
RALEIGH, NC 27605
February 25 – 28, 2003

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Conclusion

The SEDAR Review Panel accepted the appropriateness of the data used in the stock assessments for the vermilion snapper and black sea bass stocks and of the models used for stock assessment and projection. However, the Panel noted a number of issues that, if resolved, might improve the quality of future assessments.

1. SEDAR Assessment Review Panel Workshop

The SEDAR Review Panel met at the Holiday Inn-Brownstone Hotel, 1707 Hillsborough Street, Raleigh, NC 27605, from February 25 to 28, 2003, to review the assessments of the stocks of vermilion snapper and black sea bass, which occupy waters off the south eastern coast of the U.S. Members of the Review Panel and attendees of the workshop are listed in Appendix 1.

The initial Terms of Reference, which were considered by the Review Panel and which reflected the terms of reference for the data and assessment workshops, were:

1. Evaluate the adequacy and appropriateness of fishery-dependent and independent data used in the assessment (i.e. was the best available data used in the assessment)
2. Evaluate the adequacy, appropriateness and application of models used to assess these species and to estimate population benchmarks (MSY, Fmsy, Bmsy and MSST, i.e. Sustainable Fisheries Act items);
3. Evaluate the adequacy, appropriateness, and application of models used for rebuilding analyses;
4. Develop recommendations for future research for improving data collection and the assessment;
5. Prepare a report summarizing the peer review panel's evaluation of the black sea bass and vermilion snapper stock assessments. (Drafted during the Review Workshop, with the Final report due two weeks after the workshop- March 14, 2003);
6. Prepare a summary stock status report including management recommendations. (Drafted during the Review Workshop, with the Final report due two weeks later - March 14, 2003.)

A revised version of the terms of reference was received just prior to the SEDAR meeting. This document specified the terms of reference as:

1. Evaluate adequacy and appropriateness of fishery-dependent and fishery-independent data used in the assessment to accurately characterize stock status.
2. Evaluate adequacy, appropriateness, and application of models used to assess black sea bass and vermilion snapper and to estimate population benchmarks (i.e., SFA-required benchmarks of MSY, Fmsy, Bmsy and MSST and MFMT).
3. Evaluate adequacy, appropriateness, and application of models used for rebuilding analyses. Probability of rebuilding (to MSST and MSY) over time under the following fishing mortality scenarios are to be included: (a) F under current management regulations, (b) F=150% Fcurrent, (c) F=125% Fcurrent, (d) F=75% Fcurrent, (e) F=50% Fcurrent, (f) F=25% Fcurrent, (g) F=0, and (h) F=99% Fmsy.
4. Develop recommendations for future research for improving data collection and the assessment;
5. Prepare a Consensus Assessment Report summarizing the peer review panel's evaluation of the black sea bass and vermilion snapper stock assessments. (Drafted during the Review Workshop, Draft available by February 28th; Final report due two weeks after the workshop- March 14);
6. Prepare an Advisory Report to include a summary of stock-status report and forecast for the upcoming year. (Drafted during the Review Workshop; Draft available by February 28th; Final report due two weeks later -March 14)

As the Data and Assessment Workshops had not had the opportunity to run and review the projections for the various rebuilding strategies listed in Item 3, it was inappropriate for the Review Panel to request that these projections be calculated. The stock assessment team from NMFS indicated that it would be appropriate for the SAMFC to submit a request for these additional runs to NMFS and, as with other such requests from the Council, they would endeavor to produce the necessary outputs for the Council's consideration.

2. General

1. The descriptions in the assessment reports of the methods, which were used to collect and to analyze the data used in the assessments, were not sufficiently complete for a thorough and comprehensive review. Similarly, technical descriptions of the model structure, which were provided in the assessment reports, were sketchy and insufficiently complete. Accordingly, members of the Review Panel were obliged to base much of their assessment on the information provided in the verbal presentations. It is possible that the detailed descriptions that were sought by members of the Review Panel may be presented in the reports of the Data or Assessment workshops. However, if not, it is recommended that the assessment reports for future stock assessments should include more detailed descriptions of the methods of data collection, analysis, and the use of these data for stock assessment. Generic descriptions of these methods should be developed, that are broadly applicable to this and future assessments.

2. For future stock assessments, sufficient details of the methods of data collection should be provided to allow the Review Panel to assess the extent to which catches from different spatial or temporal zones or from different fishing sectors have been representatively sampled, how the various samples are combined, and the sampling intensity that has been applied to the different sectors. Standard errors of estimates of landings and of the various abundance indices should be calculated whenever possible, and potential sources of bias should be identified and adjusted for when feasible. It is acknowledged that the data will be adjusted in the model for gear selectivity. In the current assessment, the Review Panel was not able to assess whether samples were representative and, if not, the likely magnitude of bias that would result.
3. The Review Panel considered that minimum levels of sampling intensity and spatio-temporal coverage to achieve acceptable precision for key population parameters should be specified by the assessment team and that sample sizes should be increased if the sampling intensity should fall below this minimum level. The sampling designs of the various data collection methods should be reviewed for statistical adequacy (sampling intensity and spatio-temporal coverage).
4. Data should be reported in tabular as well of graphical format, to allow the Review Panel to explore miscellaneous aspects of the data.
5. For future SEDAR reviews, the biological evidence and scientific motivation that led to the selection of the base parameter case as well as alternate parameter choices that are considered for sensitivity runs should be documented in the Assessment Report. Such selection will most likely take place at the Data Workshop, but any modifications that are made at the Assessment Workshop should also be recorded.

3. Vermilion Snapper

3.1. Adequacy and appropriateness of the data

3.1.1. The Panel accepted that the data used were the most appropriate data that were available and were adequate for conducting an assessment.

3.1.2. The Panel noted that the limited time series of the indices of abundance appeared to reflect a lack of contrast in the levels of exploitation to which the stock had been subjected in the period covered by the time series. This greatly reduced the information content of the data and led to imprecise estimates of MSY based benchmarks, as stated in the assessment workshop report.

3.1.3. The Panel noted that the headboat index appeared to be strongly influential, but recognized that this index might not adequately represent the entire stock as this fishery does not extend to the deepest waters where vermilion snapper are taken. The Panel expressed the view that an index or indices of abundance should be developed using data from the commercial fishery and that this index should be considered for inclusion in the next stock assessment for this fishery. For commercial logbook data, costs might be reduced by analyzing a representative subset of the full data set or by

analyzing the logbooks derived from a selected subset of representative vessels.

3.1.4. The Panel was concerned that the fishery-independent indices of abundance (*i.e.* MARMAP) did not cover the full extent of the offshore range of the stock and were constrained to a period from May to September. The Panel recommended that consideration should be given to developing robust fishery-independent indices of abundance that are likely to be more representative of the spatial distribution of the stock, and representative of all months of the year.

3.1.5. The Review Panel voiced its concern that the MARMAP sampling is being downgraded due to budget constraints.

3.2. Adequacy and appropriateness of the models

3.2.1. The Panel acknowledged that, based on the available information, the implementation of the models was sound and endorsed the decision to use both a production model and a length-structured forward projection model for the assessment of the vermilion snapper stock.

3.2.2. The Panel acknowledged that, because there was only limited information on historical abundances, the Assessment Workshop was unable to fit the production model.

3.2.3. The Review Panel noted that the value estimated for the steepness[1] of the stock-recruitment relationship in the base run of the model was 0.9, a result which would imply that recruitment shows little dependence on egg production.

3.2.4. The Review Panel concurred with the Assessment Workshop's conclusion that the estimate of MSY was uncertain and endorsed the decision that F_{max} should be proposed as an appropriate proxy for F_{msy}. The Review Panel agreed that the estimate of the current level of egg production (a measure of spawning stock size) was poorly estimated, as the sensitivity analyses produced widely disparate estimates of egg production, but noted that the estimates of F and of F_{max} were relatively consistent among the alternative sensitivity runs.

3.2.5. The Panel suggested that, in future assessments, consideration should be given to calculating and presenting estimates of the abundance-at-age weighted fishing mortality to supplement the information that is presented on the fishing mortality for fully-recruited fish.

3.3. Adequacy and appropriateness of the models used to evaluate short-term projections

3.3.1. The Review Panel endorsed the adequacy and appropriateness of the model that the Assessment Workshop had applied to evaluate projections.

3.3.2. There is a high level of uncertainty in determining whether or not the stock is overfished. The SEDAR Review Panel concluded that the stock was

[1] The "steepness" of the stock-recruitment relationship, which was used in the model, is a value that can range from 0.2 to 1.0 and is the fraction of the virgin recruitment that will recruit to the fishery when the spawning stock is reduced to 20% of its virgin level. If steepness is 0.2, recruitment is directly proportional to the size of the spawning stock, whereas if steepness is 1.0, recruitment is constant and independent of the size of the spawning stock.

not overfished by restricting its attention to points E, D, H, and G in the phase plot of status indicators (Figure 19[2]). These four points reflect the uncertainty in the stock-recruitment relationship by spanning a wide range for steepness (0.7-0.95) and the most likely range for natural mortality (0.25-0.3/yr).

3.4. Research recommendations

The following recommendations have been listed in order of their priority, as perceived by the Review Panel.

3.4.1. The panel proposed that MARMAP conduct a synoptic study of their gear to provide a basis for comparing relative gear efficiencies. This would allow a more comprehensive fishery-independent index to be developed.

3.4.2. Age samples from the various fishery sectors need to be increased and collected appropriately for use in stock assessment.

3.4.3. Commercial fisheries data (including logbooks) should be analyzed to determine whether it is possible to develop a reliable fishery-dependent index of abundance from these data.

3.4.4. MARMAP should be expanded into deeper water to assure greater representation of the spatial range of the stock.

3.4.5. A monitoring program should be developed to collect data on the magnitude and the size/age composition of the vermilion snapper that are discarded by each fishing sector and from each fishing gear.

3.4.6. An index of recruitment representative of the entire stock should be developed for vermilion snapper.

3.4.7. The Panel recommended that, as an alternative model that could be applied in parallel with the existing model, consideration might be given to combining the indices of abundance externally and using the resultant combined index in the length-structured model rather than including the separate indices within the model. This suggestion was also made with respect to the black sea bass assessment. The external analysis might provide better understanding of the input data and make the weighting more transparent.

4. Black sea bass

4.1. Adequacy and appropriateness of the data

4.1.1. The Panel accepted that the data used were the most appropriate data that were available and were adequate for the assessment.

4.2. Adequacy and appropriateness of the models

4.2.1. The Panel endorsed the decision to use an age-structured forward projection model for the assessment of the black sea bass stock.

4.2.2. The Panel was of the opinion that the application of a production model for a protogynous species such as the black sea bass might be inappropriate, and recommended that its validity be further researched.

4.2.3. The Panel considered that the assumed abrupt changes in the proportion of females that are mature at each age and the transition from female to male between the three time periods should be linked and replaced by a smoother

[2] References to tables and figures refer to the tables and figures presented in the corresponding report from the Assessment Workshop.

transition (*e.g*. moving average) in future assessments of the black sea bass stock.

4.2.4. The Panel noted that the index of abundance derived from the headboat data appeared highly influential on the assessment results. The Panel suggested that it would be useful to confirm this perception by eliminating the time series from the objective function and refitting to determine whether the remaining data are sufficient to produce a similar result to that obtained when the headboat data are included. If the headboat data are strongly influential, the Panel noted that this index was fishery-dependent but recognized that the GLM analysis had attempted to adjust for some of the factors that could affect the trends exhibited by this index.

4.2.5. The Panel noted that the Assessment Workshop had not attempted to correct for the likely increase in the effectiveness of fishing effort, and thus the current stock biomass may be lower than has been estimated.

4.2.6. The Panel noted that no commercial discards are calculated by the black sea bass model because larger fish were landed prior to the implementation of the minimum size limit in 1983 (Figure 6.5). The Panel concluded this would result in a slight underestimation of the current fishing mortality.

4.2.7. The Panel recommended that, noting the total biomass included the male portion of the stock, when considering the results from the current assessment, total mature biomass should be used when assessing stock status. The methods used in the current stock assessment to calculate the mature female biomass are possibly inappropriate. The Panel recommended further research on the issue.

4.2.8. The Panel suggested that, in future assessments, the historical landings (landings before 1972) be included in the age-structured model. This would require development of a slightly different model structure.

4.3. Adequacy and appropriateness of the models used to evaluate rebuilding

4.3.1. The Review Panel endorsed the adequacy and appropriateness of the model that the Assessment Workshop had applied to evaluate rebuilding.

4.3.2. The Panel concluded the benchmarks had been adequately calculated and the sensitivity runs adequately bracketed the likely range of variation.

4.4. Research recommendations

The following recommendations have been listed in order of their priority, as perceived by the Review Panel.

4.4.1. The Panel requested that SC DNR expand their MARMAP efforts to conduct a synoptic study of their gear to provide a basis for comparing relative gear efficiencies and thus connecting the several short MARMAP indices available for this assessment.

4.4.2. Commercial fisheries data, including logbooks, should be analyzed to determine whether it is possible to develop a reliable fishery-dependent index of abundance from these data.

4.4.3. The monitoring program should be expanded to collect data on the magnitude, release mortality, and the size/age composition of the black sea bass that are discarded by each fishing sector and from each fishing gear and depth.

4.4.4. Age samples need to be increased and collected appropriately for use in aging the catches of the various fishery sectors. Furthermore, the possibility of determining reliable age compositions from the historical MARMAP age samples needs to be evaluated.

4.4.5. The Panel suggested that a comprehensive study and documentation of the abundance index derived from the headboat data would be useful. For example, consideration might be given to whether changes in fishing operations, including species composition of landings, might reflect changes in catchability of black sea bass that have not been taken into account by the GLM.

4.4.6. The Panel considered that, through more detailed examination, it might be possible to develop an acceptable abundance index from the MRFSS data and suggested that this should be investigated.

4.4.7. An index of recruitment for the stock should be developed.

4.4.8. Research should be initiated to estimate fecundity by female size and age.

4.4.9. The Panel considered the possibility that fish from the assemblages of black sea bass located north and south of Cape Hatteras, NC, might mix and suggested that a research study should be initiated to investigate its magnitude, geographic extent, direction, timing and management implications.

4.4.10. The Panel recommended that the issue of whether it is more appropriate to use total mature biomass, mature female biomass or some other measure of spawning potential for a protogynous hermaphrodite should be investigated.

4.4.11. The Panel concluded that the application of a production model should be investigated as to its appropriateness for a protogynous species.

4.4.12. The behavioral dynamics associated with reproduction in this protogynous species should be investigated with respect to the effects of size selective harvesting.

Appendix 1. Members of the SEDAR Review Panel, Raleigh, February 25-28, 2003.

The following list of names was circulated at the SEDAR Review.

Panel Chair	Dr Norman Hall	Centre for Independent Experts, Western Australia
Review Panelist	Dr Jon Volstad	Centre for Independent Experts, Maryland
Review Panelist	Dr Liz Brooks	NMFS SEFSC
Review Panelist	Gary Shepherd	NMFS NEFSC
Review Panelist	Gregg Waugh	SAFMC
Review Panelists	Mark Marhefka (vermilion snapper) Jodie Gay (black sea bass)	Snapper Grouper Advisor Panel
Review Panelist	Dr Michelle Duval	NGO/SSC Representative, NC Environmental Defense
Review Panelist	Douglas Gregory	SSC Representative, Florida Sea Grant

Apologies: Dr Robert Muller was unable to attend the Review Workshop
Mark Marhefka was unable to attend much of the Review Workshop.

Presenters:

Data/Assessment Workshops Chair - Dr Jim Berkson, VPI
(Technical Support – Michelle Davis, Mary Tilton, VPI students)
Assessment Workshop Coordinator – Dr Michael Prager, NMFS Beaufort Lab

Assessment Workshop/Review Panel Support Staff:

Dr John Merriner, NMFS SEFSC Beaufort Lab
Dr Erik Williams, NMFS SEFSC Beaufort Lab
Dr Kyle Shertzer, NMFS SEFSC
Dr Doug Vaughan, NMFS SEFSC Beaufort Lab
Joe Geist, NC DMF and SSC
Dr Pat Harris, MARMAP and SSC
Ms Jennifer Potts, NMFS SEFSC

Meeting Support Staff & Other Attendees

Rick DeVictor, SAFMC Staff
Wayne Lee, Chair SAFMC Snapper Grouper Committee
Dr Louis Daniel, SAFMC Snapper Grouper Committee & NC DMF
George Geiger, SAFMC Member
Dr Pete Eldridge, NMFS SERO